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Will the United States Have a Shortage of Physicians in 10 Years?

Executive Summary

Researchers and other experts continue to debate whether the United States will have a shortage of physicians in the future and, if so, whether the government should act now to expand medical school capacity and encourage hospitals to train more residents. Several studies have forecast that there will be a shortage of about 100,000 to 200,000 physicians in 2020, and many medical schools are responding by expanding capacity. However, a prominent group of researchers argue that the perceived shortage of physicians is a symptom of a more fundamental problem rather than being the problem itself, and expanding the supply of physicians would merely lead to the provision of relatively low-value medical care. It is important for policymakers to determine the adequacy of physician supply as they consider provisions to reduce the uninsured and increase the demand for physician services. This paper provides a brief history of government involvement in physician workforce planning, describes and assesses the methods used by the two sides in the physician-shortage debate, and addresses the fundamental underlying views that determine many observers' positions in this debate.

Introduction

Researchers and other experts continue to debate whether the United States will have a shortage of physicians in the future and, if so, whether the government should act now to expand medical school capacity and encourage hospitals to train more residents. Between 2002 and 2006, three separate forecasting models concluded that by 2020 the demand for physician services will exceed the supply of physician services by 85,000 to 200,000 physicians (Cooper et al., 2002; COGME, 2005; Dill and Salsberg, 2008). A number of states and medical specialty societies have likewise concluded that there currently is a shortage of physicians or soon will be (Iglehart, 2008). In response to a recommendation by the Association of American Medical Colleges (AAMC) that medical school capacity should be expanded by 30 percent, a majority of medical schools have announced plans to increase their incoming classes. Several prominent individuals and organizations have recommended that Congress should undo the provision in the Balanced Budget Act of 1997 that capped the number of residents eligible for graduate medical education payments for hospitals (Iglehart, 2008).

On the other side of the debate is a group of researchers, mostly affiliated with Dartmouth College, who argue that the perceived shortage of physicians is a symptom of a more fundamental problem rather than being the problem itself. They perceive the real problem to be "...a largely disorganized and fragmented delivery system characterized by a lack of coordination, incomplete patient information, poor communication, uneven quality, and rising costs" (Goodman and Fisher, 2008). Proponents of this view recommend maintaining the cap on resident funding, shifting medical education resources to primary care, and

reforming the reimbursement system to provide incentives for integrated and coordinated medical care.

The outcome of this debate may be important for policymakers when considering whether and how to reform the health care system. Current reform discussions anticipate reducing the number of uninsured by about two-thirds, or 30 million people. Will the United States have enough physicians to care for formerly uninsured individuals when their demand for medical care increases? Will the United States have enough physicians even if the number of uninsured remains the same? Most reform bills being debated in Congress are creating incentives for providers to organize into accountable care organizations (ACOs), which will emphasize primary care services, coordinate care between providers, and be accountable for health outcomes and treatment costs. Will the United States have enough primary care physicians to allow ACOs to develop throughout the country?

David Blumenthal (2004) provides a useful framework to evaluate this debate, "the debate on the physician workforce would be simpler to understand, but less interesting, were it not for disagreements about the methods that are used to predict the supply of and demand for physicians in the future. Roiling beneath the technical disputes are strongly held views about the value of all medical care services and whether our health care system can or should be reformed." This paper provides a brief history of government involvement in physician workforce planning, describes and assesses the methods used by each side in the debate, and addresses the fundamental underlying views that determine many observers' positions in this debate.



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The Government's Assessment of the Adequacy of Physician Supply: A Brief History

The U.S. government exerts a strong influence on the number and specialty mix of physicians and, as such, has a long history of trying to forecast the future supply of and demand for physician services. In 1959, the Surgeon General's Consultant Group on Medical Education published a study (known as the Bane Report) predicting a shortage of 40,000 physicians by 1975 (Blumenthal, 2004). The federal government responded to that report by providing subsidies to medical schools, which encouraged universities to open new medical schools and expand enrollment at existing medical schools. As a result, enrollment at U.S. medical schools doubled between 1960 and 1980, and the number of active physicians grew from 259,000 (145 per 100,000 population) in 1960 to 453,000 (200 per 100,000 population) in 1980 (American Medical Association, 2008).

The government eventually became concerned that its policies might have been too successful. In 1976, Congress asked the Graduate Medical Education National Advisory Committee (GMENAC) to determine the number of physicians required to meet the health care needs of the nation, the most appropriate specialty distribution of these physicians, ways to achieve a more favorable geographic distribution of physicians, and how to finance graduate medical education (American Academy of Pediatrics, 1981). The GMENAC published a report in 1981 predicting a surplus of 145,000 physicians by 2000, or 23 percent of the projected workforce. That report recommended restricting enrollment in U.S. medical schools and the flow of immigrating international medical school graduates (IMGs) (Blumenthal, 2004).

Congress responded to that report by eliminating subsidies to medical schools, and this achieved the intended effect—the number of students graduating from U.S. medical schools has essentially remained constant over the last 30 years at about 16,300 per year. Despite this slowdown in the flow of medical students, there are now

744,000 physicians practicing in the United States, or about 280 per 100,000 people. There are two reasons why the physician workforce has continued to grow. First, it takes about 40 years for an increase in the flow of medical school graduates to fully affect the stock of practicing physicians. Second, the prospective payment system instituted in 1983 provided teaching hospitals with average payments (or subsidies) of \$70,000 for each additional resident hired. Not surprisingly, hospitals responded to those incentives by hiring about 6,000 to 10,000 IMGs per year as residents, in addition to the 16,000 U.S. medical school graduates. Many of these IMGs decided to practice in the United States after completing residency training.¹ Although the resident subsidies were at odds with GMENAC's recommendations, the primary objective of these payments was to prevent teaching hospitals from losing substantial amounts of money in the new reimbursement system, not to expand the physician workforce (Nicholson, 2002).

Throughout the past 30 years, about one-third of physicians in the United States have practiced in one of the primary care specialties of family practice, pediatrics, or general internal medicine, with the remaining two-thirds in non-primary care specialties such as OB/GYN, psychiatry, and general surgery. As managed care grew during the 1980s and 1990s, policymakers became worried that the United States was producing too few primary care physicians (or generalists). Primary care physicians were believed to be instrumental to the success of managed care by functioning as gatekeepers to more expensive specialized (non-primary care) medicine. Congress therefore created the Council on Graduate Medical Education (COGME) in 1986 to provide advice on physician workforce policies. COGME issued a series of reports in the early 1990s predicting a surplus of specialists, a shortage of generalists, and an overall surplus of 80,000 physicians by 2000. That latter prediction confirmed the GMENAC's earlier estimate, although COGME's projected surplus was smaller.

In January 2009, the Changes in Health Care Financing and Organization (HCFO) Initiative convened an invitational work group meeting as part of its program, 2009 Policy Reform: Implications of the Supply and Organization of the Delivery System on Health Care Reform, sponsored by the Robert Wood Johnson Foundation. The work group, co-chaired by Robert Berenson, M.D., and Harold Luft, Ph.D., commissioned several papers, including this background paper by Sean Nicholson, Ph.D.

COGME also recommended capping hospital residency positions at 110 percent of the number of U.S. medical school graduates and enacting policies to ensure that 50 percent of newly-trained physicians would enter primary care specialties. Because there were 40 percent more residency positions than U.S. medical school graduates at the time, enforcing the former recommendation would most likely have translated into fewer IMG residents (and subsequently fewer practicing physicians). The Clinton Health Security Act, which failed to gain congressional support in 1994, would have implemented COGME's recommendations in their entirety.² In 1997, Congress did cap the number of residency positions that were eligible for graduate medical education payments, which slowed the growth in the number of residents (and IMGs) trained at teaching hospitals.

As is evident from this 40-year review, government policy has been influenced strongly by the recommendations of various councils. Because economists are confident that the labor market determines the "correct" number of workers in most professions, it is worth discussing why the government is involved in physician manpower planning at all. Surpluses and shortages are usually self-correcting. If a certain group of professionals is willing to supply more services than consumers are willing to buy at the prevailing price, competition between professionals should drive down prices and income. Increased

competition will make the occupation less attractive, thereby reducing the number of college graduates entering the profession. The reduced flow of professionals will increase prices/fees and income until the financial return to education and training is once again commensurate with the return in other professions. Conversely, if there is a shortage such that customers must wait months to schedule an appointment with a certain type of professional, customers will bid up fees and incomes will rise. Higher incomes will encourage a greater number of students to enter the profession until long run supply again equals demand.

There are several possible justifications for government involvement in determining the number and specialty mix of physicians. First, there is a considerable lag between when students apply to medical school and when they begin practicing medicine in a particular specialty. If the government knows there will be a future shortage or specialty imbalance, it would be prudent to act before the shortage actually manifests itself. Nevertheless, it's not clear whether GMENAC or COGME are able to forecast future demand and supply conditions any better than prospective physicians, who clearly have substantial private incentives to acquire good information.

Second, consumers/patients are not as well informed about their health, available treatment alternatives, and the quality of health care providers as the providers themselves. Requiring physicians to attend an accredited medical school in order to be licensed is a way to assure patients that practicing physicians are of sufficiently high quality. But because patients rely heavily on physician recommendations, physicians may be able to induce demand for their own services. Therefore, if “too many” physicians are trained, physicians could shift out demand for their services such that their fee would not fall as it would in a market where consumers are well informed. People who believe physicians can and do induce demand for their own services are also likely to view constraining the supply

of physicians as a means of preventing an increase in low-value medical services. As discussed in the following section, the current debate regarding whether there will be a shortage of physicians is fundamentally a debate regarding whether physicians induce demand (consciously or subconsciously) for their own services and the value of increased medical spending.

Recent Models Predicting a Shortage of Physicians by 2020

How accurate were the GMENAC and COGME predictions of a physician surplus in 2000? Most people have concluded that the forecasts were not accurate at all. Although the mean physician income in the United States fell by nine percent in real terms between 1993 and 2000, each newly trained primary care resident in the beginning of this decade was receiving an average of about three job offers, whereas newly trained specialist residents were receiving about four offers (Nolan et al., 2002). One explanation for the inaccuracy is that the models were unable to forecast the rejection by consumers of the tightly managed, primary care-centered HMO model in favor of the more open-access PPO model. Another explanation is that the growth in gross domestic product (i.e., national income) and population between 1980 and 2000 increased patients' demands for physician services, while the growth of female physicians in the workforce reduced the effective supply of physician services because they work fewer hours, on average, than their male colleagues.

Cooper, Getzen, McKee, and Laud emphasized this latter explanation in their influential 2002 paper published in *Health Affairs*.³ They begin by assuming that in the baseline year, 2000, the demand for physician services is equal to the observed supply of physician services. Demand and supply are then separately forecast to 2020 based on key underlying trends. Economic expansion and population growth are assumed to be the key drivers of changes in the demand for physician services, while the changing work effort of physicians and

the supply of non-physician clinicians (e.g., nurse practitioners and physician assistants) are assumed to be the key drivers of changes in the supply of physician services. The most novel contribution of the model is the assertion that an increase in a country's income drives an increase in the demand for physician services; Cooper and colleagues forecasted the supply of physicians in a fairly traditional manner. Details on their method of forecasting the demand for and supply of physician services are presented in the Technical Appendix.

When Cooper et al. (2002) applied the forecasted growth in income, population, changing demographics of the physician workforce, and growth in the supply of physician substitutes to their model, they concluded that the demand for physician services will exceed the effective supply of physician services by 50,000 physicians in 2010, and by 200,000 in 2020.⁴ As a result, Cooper et al. recommended that the United States increase the number of residents trained per year by 10,000 (about 40 percent) to reduce the impending physician shortage (Croasdale, 2007).

The work by Cooper and his colleagues convinced COGME in 2005 to update and modify its physician forecasting model. COGME's supply projection is almost identical (i.e., only 0.7 percent higher) to that of Cooper and colleagues. The real difference with the Cooper et al. (2002) model is on the demand side. COGME (2005) estimated the demand for physician services using a microanalysis typical of physician forecasting models. First, the U.S. population is assigned to age-gender-location-insurance status cells (e.g., 18-44 year-old females living in an urban area and enrolled in a fee-for-service health plan). Second, current physician-population ratios are applied to each cell. Third, the increase in the demand for physician services that occurred between 1990 and 2000 is assumed to continue throughout the 2000-2020 period. Details on the COGME (2005) method are described in the Technical Appendix.

COGME estimates that there will be a supply of 1,025,000 physicians in 2020. Although they formed several demand forecasts, COGME's preferred estimate of the demand for physician services in 2020 is 1,110,000 physicians. This implies that there will be a predicted shortage of 85,000 physicians in 2020, a little less than half the shortage forecasted by Cooper et al. (2002).⁵ Based on their analysis, COGME recommended expanding U.S. medical school enrollment by 15 percent and eliminating the cap on the number of residents eligible for graduate medical education subsidies.

States and specialty societies are echoing the conclusions of Cooper et al. (2002) and COGME (2005). Fourteen states have issued reports since 2000 concluding that there is or soon will be a shortage of physicians (Iglehart, 2008). Between 2003 and 2008, 16 specialty societies issued studies that come to a similar conclusion (Edward Salsberg, May 9, 2008 presentation). In June 2006 the AAMC recommended a 30 percent increase in medical school capacity—double the COGME (2005) recommendation but smaller than that of Cooper et al. (2002). The American Medical Association also generally supports expanding capacity.

Medical schools have responded to those recommendations and the seeming consensus view that there will be an impending shortage of physicians. According to a 2006 study, 93 of the 126 U.S. medical schools have already or are planning to increase class sizes above their 2002 levels. Based on a 2007 survey, the AAMC estimates that by 2012 first-year medical school enrollment will be 21 percent higher than it was in 2002, and 30 percent higher by 2017. Moreover, about 10 new medical schools are expected to open by 2015 (Iglehart, 2008). However, those actions will not necessarily increase the future physician workforce by 30 percent. If the resident caps on graduate medical financing remain in place and teaching hospitals choose not to offer new residency positions at lower (perhaps negative) wages, the expansion of U.S. med-

ical schools may just displace IMGs without changing substantially the number of residents completing training each year.

An Opposing Opinion

David Goodman and many colleagues at Dartmouth believe that the perceived shortage of physicians is a symptom of the problem rather than the problem itself. Rather than adding more physicians, proponents of this view favor reforming payment systems to promote integrated and coordinated medical care, reallocating medical education funding toward primary care, and maintaining the cap on graduate medical education financing.

Goodman's argument begins with the observation that there is substantial variation between health referral regions (HRRs) in the number of physicians per capita. Specifically, the mean physician per capita ratio in regions in the highest quintile is 50 percent higher than regions in the lowest quintile (Goodman and Fisher, 2008). That variation is greater than the predicted shortage of physicians in 2020 in all of the models reviewed above. They find no evidence that the variation is driven by differences in patients' health status or preferences for how they would like to be treated. For example, there is no statistical relationship between the number of neonatologists per birth in a region and the percentage of births that are low birth weight (Goodman et al., 2002), nor any relationship between the number of cardiologists per capita in a HRR and the number of heart attacks per Medicare enrollee (Wennberg, 2000). Likewise, there is no relationship between how intensively Medicare beneficiaries would like to be treated and physician supply.

Furthermore, there is little evidence that people living in regions with a relatively large supply of physicians receive better quality care, experience superior health outcomes, are more satisfied with their care, or have better perceived access to care relative to people living in regions with fewer physicians per capita. For example, birth

outcomes are not significantly better in regions with the highest number of neonatologists per birth relative to regions in the second, third, or fourth quintiles in terms of neonatologist supply (Goodman et al., 2002). Heart attack and congestive heart failure patients in regions with a relatively large number of physicians per capita are only slightly more likely to receive recommended processes of care (e.g., beta blockers within 24 hours of admission) than patients in regions with fewer physicians (Goodman and Fisher, 2008). Finally, there is little difference in Medicare beneficiaries' perceptions of access to care and satisfaction with care across regions with differing physician supply (The Dartmouth Institute for Health Policy & Clinical Practice, 2008).

Regions with relatively large physician-to-populations ratios do generate higher medical spending than other regions. If one categorizes HRRs according to how much is spent on Medicare beneficiaries in their last six months of life, regions in the most expensive quintile have 31 percent more physicians per capita than regions in the lowest quintile. Furthermore, the expensive regions have fewer family practitioners and more medical and surgical specialists than the relatively inexpensive regions. The executive summary to the 2008 Dartmouth Atlas offers the following assessment for why regional variations in spending and physician supply do not appear to generate superior health outcomes:

The likely explanation for both the dramatic differences in spending and the strong correlations with supply lies in the lack of firm scientific evidence available to guide most clinical decisions; the general assumption among both physicians and patients that more medical care means better care; the marked variations in supply that emerge in an unplanned marketplace; and a fee-for-service payment system that rewards providers for staying busy. Physicians adapt their practices subliminally to the available resources.

From the primary care physician's perspective, for example, it will often seem more efficient to refer to a specialist or admit to the hospital if those resources are available and payments for office-based primary care have been constrained. The key element of the theory is that because so many clinical decisions are in the 'gray areas' of medicine where evidence is now lacking (how often to see a patient, when to refer to a specialist, when to admit), any expansion of capacity will result in subtle shifts of clinical judgment toward greater intensity of care.

Baicker and Chandra (2004) find that the specialty mix of physicians in a region does matter. Specifically, states where family practitioners represent a relatively large percentage of practicing physicians tend to spend less per Medicare beneficiary and have higher quality of care, as measured by a composite of 24 process measures for treating six common medical conditions. Conversely, spending is higher and quality is worse in states where specialists represent a relatively large percentage of physicians. They do not find a correlation between the number of nurses per capita and either spending or quality at the state level.

What is likely to happen if the physician workforce expands? According to Goodman (2004), between 1979 and 1999 almost 80 percent of newly trained physicians were located in areas where the physician-to-population ratio was already high (i.e., the top three quartiles in 1979). Based on the quote above, adding physicians to areas that are already expensive will create additional capacity, lead primary care physicians to refer more "borderline" patients to specialists, generate more low-value visits/procedures, and will exacerbate spending without improving health outcomes.

If one accepts the argument advanced by Goodman and his Dartmouth colleagues, what policies should be adopted? The executive summary of the 2008

Dartmouth Atlas compares Medicare spending and use of physicians for Medicare beneficiaries in their last two years of life across the academic medical centers ranked in the top five of the *U.S. News and World Report* 2007 Honor Roll for America's Best Hospitals. At the University of California, Los Angeles, an average of 38.5 physicians were involved in each patient's medical care and Medicare spent \$94,000 per beneficiary, whereas at the Mayo Clinic only 20.3 physicians were involved and Medicare spent \$53,000. Goodman and Fisher recommend: 1) maintaining the cap on graduate medical education funding; 2) shifting medical education funding toward primary care specialties; and 3) instituting a payment system that provides incentives for the integrated, coordinated, and efficient care that appears to be provided by the Mayo Clinic.

Critique of the Forecasting Models and the Dartmouth View

Some economists and policymakers dismiss the predictions of Cooper et al. (2002), COGME (2005), and the Health Resources and Services Administration (HRSA) due to general skepticism about the ability of anyone to forecast the health care market far into the future. As Reinhart (2002) mentions in the same *Health Affairs* issue where the Cooper et al. (2002) article appears, "It is a daunting enterprise to estimate the physician surplus or shortage one or two decades into the future." An example of the difficulty of forecasting the future health care market is occurring right before our eyes. Health insurers have responded to the persistent rise in medical costs by setting increasingly higher patient cost sharing for physician visits and prescription drugs. Presumably as a result, the number of prescriptions filled fell by 0.5 and 2.0 percent in the first two quarters of 2008, and the number of physician office visits has been trending down since 2006.⁶ That is an example of how the health care market evolves in ways that are difficult for modelers to anticipate.

Skepticism of models is bolstered by the inaccuracy of previous models such as the 1981 GMENAC report, the COGME studies of the early 1990s, a Pew Commission report that projected a surplus of 150,000 physicians, and an Institute of Medicine prediction that managed care would reduce the demand for physician services. If previous models were not able to accurately forecast the health care market 20 years hence, why should we expect version 2.0 or 3.0 to be any better? One way modelers have responded to that concern is by creating a series of alternative scenarios that allow for a range of estimates of key parameters: changes in age-specific demand for physician visits, physician productivity, number and degree of substitutability of non-physician clinicians, and relationship between income and the demand for physician services. But, this modeling approach comes with a cost: how does one identify the most likely scenario among a host of possible scenarios, and does the role for discretion make the exercise less objective and more prone to partisan politics? In defense of the modelers, though, for purposes of setting physician workforce policy, it may be more important to understand whether there is likely to be a reasonably large shortage of physicians in the future than knowing the precise magnitude of any shortage. That is, the government could encourage the expansion of medical school capacity now and postpone a decision on whether to encourage teaching hospitals to hire more residents until more data are collected regarding a shortage. In the meantime, IMGs could continue to serve as a means of adjusting the workforce in the short run.

All existing models make the convenient assumption that at the beginning of the forecast period supply is equal to demand, but in the future supply and demand are forecasted separately. In fact, the whole point of the exercise is to see if supply and demand diverge from one another. The Dartmouth criticism of this approach is that in the baseline period, many of the physician visits might be unnecessary (i.e., demand is

too high because it is determined, subtly, by capacity and physicians' recommendations), so the model builds in current inefficiencies. Economists are comfortable with the idea that if prices are regulated (e.g., set "too low"), the observed quantity of physician visits could differ from the quantity at the point where the supply and demand curves intersect. But how does one know when supply and demand are truly equal to one another and when they would be equal if not for a shortage or surplus of physicians? Barer (2002) expresses this concern when evaluating Cooper et al. (2002): "But this artificial 'conceptual link' between supply and demand, so important historically, alas has a short half-life. When it comes to the future, the conceptual link becomes an inconvenience and the umbilical cord is cut—'projections of future demand [are] based on these historic trends [but] compared with separate projections of physician supply'."

Some people have questioned the assertion by Cooper and his colleagues that there is a causal relationship between a county's GDP and demand for physician services. Cooper et al. (2002) argue, sometimes implicitly, that as income rises patients demand more physician services, and physicians respond to this patient-initiated demand by supplying more services. Reinhart (2002) posits an alternative explanation for the correlation between income and the number of observed physicians: teaching hospitals hired IMGs as a cheap source of labor, and physicians consciously or subconsciously induce demand for their own services as supply/competition increases. Because income has increased over time in the United States, any factor that is increasing over time and is omitted from the model could generate the correlation reported by Cooper et al. (2002).⁷ COGME (2005) seems skeptical of the causal interpretation as does HRSA, which is COGME's parent organization. HRSA issued its own physician manpower projection in 2006. As part of the analysis, they performed cross-section regressions similar to those run by Cooper and colleagues and found an income elasticity 50 percent smaller than the 0.75 figure.

This smaller estimate, which was not statistically significant, is similar in magnitude to a separate estimate by Koenig et al. (2003). In spite of those concerns, COGME concludes that there will be a physician shortage in 2020 without relying on the scenario that posits a causal relationship between income and demand for physician services.⁸

One of the central conclusions of the Dartmouth studies—places that spend more on medical care do not generally have superior health outcomes—has been challenged by a number of recent studies. David Cutler, for example, shows that although spending on medical care has increased substantially over the past several decades, the value of the benefits due to health improvements exceed the increased cost. Those studies are usually conducted for a single disease at a time, and have been reported for the treatment of heart attacks (Cutler et al., 1998), depression (Berndt et al., 2002), neonatal intensive care (Cutler, 2004), and colorectal cancer (Lucarelli and Nicholson, 2009). How does one reconcile the conclusion of these studies with the Dartmouth view that increases in medical spending (and increases in physician supply) are not associated with higher-quality medical care or health outcomes in the cross-section—when comparing HRRs at a point in time?

One way to reconcile the two sets of results is to argue that while many new expensive medical technologies have indeed improved health outcomes, some regional health care systems are able to incorporate technologies more efficiently than others (Skinner and Staiger, 2007). Although this may be true, another possible explanation is that there are important regional factors, such as preferences for how patients want to be treated or patient illness severity, that are difficult to measure. That could explain why certain regions have simultaneously more physicians, higher costs, and average/bad health outcomes. Economists are often skeptical of inferring causality from cross-section analyses. The Dartmouth group

is keenly aware of this and addresses the concern about unobserved variables in most of its papers. For example, focusing on spending in the last six months or two years of a patient's life is one way to try to standardize for patient illness severity (i.e., ultimately the outcome was the same for all patients).

There are two recent papers that try to estimate the causal effect of medical spending on health using a different approach than the cross-sectional analyses favored by the Dartmouth group. Doyle (2007) examines people who experience a health emergency (e.g., heart attack or stroke) while visiting Florida. Presumably, these people did not choose their travel destination based on their own health or the capabilities of the city's health care system. Doyle finds that visitors who had a health emergency in a relatively high-spending region experience better health outcomes than visitors to low-spending regions. Almond et al. (2008) compare health outcomes of babies with a birth weight just below 1,500 grams to babies with a birth weight just above this threshold. The former babies receive substantially more medical care than the latter, on average, due to clinical guidelines based on the very-low birth weight threshold. They find that the slightly lighter babies are less likely to die over the first year. Those two studies indicate that greater spending is associated with better health outcomes. It is important to point out, however, that the studies examine the causal effect of more spending, not the causal effect of greater physician availability.

Cooper engaged the Dartmouth group in a lively written debate recently in a series of articles in the December 4, 2008 *Health Affairs* web exclusive. Cooper (2008) disputed the Baicker and Chandra (2004) conclusion that states with a higher mix of specialists provide higher quality care by showing that states with more specialists per capita have higher quality, and (separately) states with more family practitioners per capita have higher quality. Baicker and Chandra (2008) point out

that the two results are compatible: the absolute number of each type of physician can matter as well as the *specialty mix* of physicians (controlling for the number). Baicker and Chandra emphasize that the beneficial effect of family practitioners on quality is 10 times larger than the beneficial effect of specialists on quality (if one accepts that there is indeed a causal relationship). In a separate paper, Cooper (2008b) shows that if one uses total spending, rather than spending on Medicare beneficiaries only, states that spend a relatively large amount per patient do provide higher quality medical care. Skinner et al. (2008) respond by raising some valid questions regarding whether the non-Medicare spending variable is really capturing what it is intended to.

Conclusion

Should the federal government implement policies to increase the supply of physician services, thereby reducing the chances of there being a future shortage? The answer depends less on whether one believes the methods used by Cooper et al. (2002), COGME (2005), and the group of Dartmouth researchers, than on one's fundamental attitude regarding whether additional medical services are worth their cost. Blumenthal (2004) points out a useful framework for evaluating whether the

United States should actively expand the physician workforce:

The physician-supply debate is therefore now enmeshed in and inseparable from a larger discussion about the value of the services physicians provide and the future of the health care system—how big it should be, how to organize it, and whether its trajectory can be controlled. Proponents of the deficit theory argue that ignoring or resisting inevitable increases in the demand for physicians' services will only lead to 'public discontent' and invite other health care professionals to take over the roles traditionally played by physicians. Proponents of the surplus theory seem to believe that constraining the supply of physicians is one way to begin restructuring our health care system in order to improve its rationality and efficiency.

Although there are some technical issues that should be evaluated critically, most people's assessments regarding whether the United States will face a shortage or surplus of physicians in the future depends on two beliefs: 1) whether policymakers have the willingness and ability to reform the health care system and improve its efficiency; and 2) whether

when more physicians begin practicing in the United States, the value of the "new" services will exceed their cost?

Consider people who are skeptical that policymakers (or the market on its own) can reform the health care system in a way that will improve physicians' productivity, and who believe that consumers are well informed and physicians cannot or do not induce demand for their own services. Those people are likely to support an expansion of the workforce in anticipation of growth in demand for physician services due to the growth and aging of the population.

Now consider people who are optimistic that policymakers (or the market on its own) can reform payment systems to improve physician productivity, who believe that expanding the physician workforce will take pressure off policymakers and make reform less likely, and who believe additional physicians would generate relatively low-value services in the existing market. Such people are likely to favor maintaining a cap on graduate medical education funding.

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Technical Appendix: Method of Forecasting Future Demand for Physician Services and Future Supply of Physician Services

Cooper, Getzen, McKee, and Laud (2002/2003)

Cooper et al. (2002) and Cooper, Getzen, and Laud (2003) describe a series of regressions that support their overall conclusion that a one percent increase in a country's gross domestic product (GDP) causes the demand for physician services to increase by 0.75 percent, on average. First, they regressed the percentage change in the number of physicians in the United States between each 10-year period of time (between 1929 and 2000) on the percentage change in GDP for the prior 10-year period.¹ Second, they performed similar longitudinal regressions for other OECD countries. Third, they regressed each state's physician-to-population ratio at a point in time on the state's per capita income. Finally, they performed similar cross-section regressions for countries and (separately) metropolitan statistical areas in the United States.

In order to forecast the supply of physicians, they assumed that the number of first-year residents would remain at its current level (23,000), 80 percent of IMGs would practice in the United States upon completing their training, and physicians in the future would continue to retire at the same ages as they do currently. Older physicians are assumed to work fewer hours than younger physicians and females are assumed to work 20 percent fewer hours than males. Finally, they forecasted a growth of approximately 180,000 non-physician clinicians by 2015. These clinicians are converted into physician-equivalent units based on the percentage of their time devoted to providing traditional physician services.

COGME (2005)

To forecast the supply of physician services, COGME assumes that 16,000 medical students will continue to graduate from U.S. medical schools each year, 5,200 IMGs will continue to be hired at teaching hospitals each year, the percentage of physicians choosing each specialty will remain the same, and physicians will work the same number of hours per year and retire at the same ages as currently. COGME supplemented the baseline supply estimates with three scenarios: 1) physicians in the future work 10 percent fewer hours per week in order to balance professional and personal activities; 2) physician productivity improves by about one percent per year, due

in part to greater use of information technology; and 3) different combinations of the first two scenarios.

Unlike Cooper et al. (2002), per capita demand for physician services does not change over time in COGME's baseline demand forecast, although it will in their preferred Scenario 2. COGME projected that the baseline demand for physicians would grow by 210,000 full-time equivalents (FTEs) between 2000 and 2020, or 26 percent. This occurs as the projected U.S. population grows, ages, and shifts into higher use "cells." In their baseline model, the demand for physicians in 2002 exceeds supply by only 16,000 physicians, or 1.6 percent of projected supply.

COGME (2005) also examines three alternative demand-side scenarios. The first alternative scenario incorporates the result from Cooper et al. (2002) that the use of physician services increases by 0.75 percent, on average, for every 1.0 percent increase in GDP. Assuming GDP will rise by 1.0 percent per over the 20-year period, COGME forecasted a 44 percent increase in the demand for physicians and a shortage of 151,000 physicians in 2020 (using their baseline supply estimate). COGME disregards the "Cooper GDP scenario" because "...it has not been decided whether there is, in fact, a causal relationship between economic growth and demand for physicians; the correlation between the two may be spurious."

In the second alternative scenario, COGME allows the age-specific demand for physician services to change in the future based on actual trends that occurred between 1980 and 2000. The number of visits per capita in the United States increased from 2.4 in 1980 to 2.9 in 2000, an increase of 21 percent (COGME, 2005). However, utilization per capita actually fell among 15-34 year-olds while rising for all other age groups except those over age 84. COGME speculates that the development and adoption of new medical technologies might be driving the increased utilization among older age groups. If the age-specific utilization trends from 1990 to 2000 continue throughout the 2000-2020 period and there is no relationship between GDP and demand (scenario 1), COGME estimates that the demand for physicians will

increase by 42 percent and a shortage similar to that of Scenario 1 will ensue. COGME concludes that this second alternative demand scenario is most likely to occur.

In the third scenario, COGME draws on two strands of studies to estimate demand if low-value "unnecessary" physician services are no longer provided. Fisher et al (2003a and 2003b) highlighted that there are substantial differences between regions in the quantity of services provided, but these differences are not correlated (or in some cases are negatively correlated) with health outcomes. Separately, Weiner (2004), Hart et al. (1997), and Goodman et al. (1996) find that the demand for physician services in closed delivery organizations (e.g., staff model HMOs), which have relatively rigorous utilization review systems, are much lower than in other organization types. If per capita demand could be reduced by 26.5 percent through the elimination of low-value services (and the levers in Scenario 1 and 2 are turned off), COGME estimates that there would be a *surplus* of 246,000 physicians in 2020. COGME (2005) chooses to disregard this scenario predicting this scenario: "As proponents of the [Fisher et al.] perspective admit, no safe ways currently exist to identify and eliminate unnecessary services."

COGME also provides an estimate of the future "need" for physician services if persons who are currently uninsured were able to obtain coverage, and if non-financial barriers to medical care (e.g., racial disparities) were removed. Specifically, they modify the demand estimates described above such that the currently uninsured demand as many physician services as those who are insured, and increase demand by two percent for all people due to the removal of non-financial barriers.² Based on those assumptions, the need for physician services is estimated to be nine percent higher than demand.

Endnotes

- 1 For example, the percentage change in GDP between 1970 and 1980 is allowed to affect the percentage change in physicians per capita between 1980 and 1990.
- 2 COGME also presents several alternative scenarios of the future need for physicians.

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Endnotes

- 1 IMGs represented 25.3 percent of the physician workforce in the United States in 2005 (American Medical Association, 2008).
- 2 A federal authority would have ensured that one-half of all residency positions would be in primary care specialties, thereby increasing the primary care mix over time.
- 3 Richard Cooper is a physician and the former dean of the Medical College of Wisconsin.

- 4 The model assumes real per capita GDP will grow 1.5 to 2.0 percent per year, causing the per capita demand for physician services to grow by 1.1 to 1.5 percent per year.
- 5 The predicted shortage is a little larger (96,000) using the estimated need rather than demand for physician services.
- 6 These data are from IMS Health, as reported in the *Wall Street Journal* in October 2008.
- 7 Although Cooper, Getzen, and Laud (2003) perform a Granger causality test, they do not report

the test result or explain it very clearly. A Granger causality test is a way of determining whether A causes B and/or whether B causes A.

- 8 There have also been concerns about the validity of the American Medical Association’s Masterfile data set that is used by most people to develop estimates of future physician supply. Staiger, Auerbach, and Buerhaus (2007) find that the Masterfile is inaccurate at both ends of the physician experience continuum. Specifically, it substantially underestimates physician retirement and the size of new cohorts of physicians.